AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In RE:

Serial no.:	09/773,243
Filing date:	January 31, 2001
For:	Tactile Feedback for Cursor Control Device
Inventor:	Tichy
Atty. Docket no.:	CTS1999
Group Art Unit:	2673
Examiner:	Shapiro

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Dear Sir:

This is in response to the Notice of Appeal filed January 29, 2004. The Commissioner is hereby authorized to charge payment of all fees associated with this communication or credit any overpayment to Deposit Account No. 03-1677.

Enclosed are triplicate copies of the appeal brief as required.

Respectfully submitted,

Mark P. Bourgeois
Reg. No. 37,782

APPEAL BRIEF

Real Party in interest

The real party in interest in the present appeal brief is CTS Corporation, the assignee of the present patent application.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of Claims

Claims 1, 3 -12, 15,16, 18 and 19 are pending and are the subject of this appeal. Claims 2, 13 -14, 17, have been canceled.

Status of Amendments

There are no amendments that have not been entered.

Summary of Invention

The invention is a tactile feedback for cursor control device and is best depicted in figures 2, 3, 4 and 5. Figure 2 shows a side view of the cursor control device with tactile feedback according to the present invention. Figure 3 shows the piezo-electric material in operation. Figure 4 shows a block diagram of an electrical circuit for operating the present invention. Figure 5 shows a circuit diagram for driving the piezo-

electric material.

The preferred embodiment of the invention is exemplified in claim 1, which recites a tactile feedback apparatus for a cursor control device that includes a cursor control mechanism 10 and a piezo-electric material 42 mounted on a semi-rigid substrate 44. The substrate 44 is coupled to the cursor control mechanism 10. Support for this is found in the specification on page 5, lines 4-17 and in figures 2 and 3. A control circuit 50 is connected to the piezo-electric material 42 to provide a signal to cause the piezo-electric material to vibrate. Support for this is found in the specification on page 7, lines 13-23 and in figure 5. The cursor control mechanism 10 provides a z-axis output signal in response to being actuated by an operator. The control circuit senses the z-axis output signal and provides a control signal to cause the piezo-electric material to vibrate in response to the z-axis output signal. The piezo-electric material vibrates for a pre-determined period of time. Support for this is found in the specification on page 8, lines 1-12 and in figure 4.

Another aspect of the invention is exemplified in claim 18, which recites a tactile feedback for a cursor control device that includes a cursor control device 10 for providing a desired cursor movement. A piezo-electric assembly 40 operates as a source of vibrations. Support for this is found in the specification on page 5, lines 4-17 and in figures 2 and 3. A control device 50 senses a predefined condition and provides an electrical signal 54 to activate the piezo-electric assembly 40. Support for this is found in the specification on page 7, lines 1-12 and in figures 4 and 5. The piezo-electric assembly 40 is mechanically coupled to the cursor control device 10 to deliver the vibrations to a user. Support for this is found in the specification on page 5, lines 4-

11 and in figure 2. An input suppression module 70 is coupled to the cursor control device 10. The input suppression module 70 is adapted to deactivate the cursor control device 10 for a pre-determined period of time in response to detecting the electrical signal 56. Support for this is found in the specification on page 9, lines 7-14 and in figures 4 and 5.

Issues

Issue 1 - Whether claim 1 is patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108) and further in view of Woodard (US 6,259,188)?

Issue 2 - Whether claims 3-6 and 9 are patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108) and further in view of Woodard (US 6,259,188)?

Issue 3 - Whether claims 7 and 8 are patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108), Woodard (US 6,259,188) and Barber (US 5,973,670)?

Issue 4 - Whether claim 10 is patentable under 35 USC 103 over Barber (US 5,973,670) in view of Seffernick (US 5,966,117), Saarmaa (US Patent Application Publication 2001/0005108) and Woodard (US 6,259,188)?

Issue 5 - Whether claims 11-12, 15 and 16 are patentable under 35 USC 103 over Barber (US 5,973,670) in view of Seffernick (US 5,966,117), Saarmaa (US Patent Application Publication 2001/0005108) and Woodard (US 6,259,188)?

Issue 6 - Whether claim 18 is patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108), Woodard (US 6,259,188) and Krukovsky (US 6,323,842)?

Issue 7 - Whether claim 19 is patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108), Woodard (US 6,259,188) and Krukovsky (US 6,323,842)?

Grouping of Claims

For each ground of rejection, which appellant contests herein, which applies to more than one claim, such additional claims, to the extent separately identified and argued below, do not stand or fall together.

Argument

Issue 1 - Whether claim 1 is patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108) and further in view of Woodard (US 6,259,188)?

Independent claim 1 recites a tactile feedback apparatus for a cursor control device that includes a cursor control mechanism and a piezo-electric material mounted on a semi-rigid substrate. The substrate is coupled to the cursor control mechanism. A control circuit is connected to the piezo-electric material to provide a signal to cause the piezo-electric material to vibrate. The cursor control mechanism provides a z-axis output signal in response to being actuated by an operator. The control circuit senses the z-axis output signal and provides a control signal to cause the piezo-electric

material to vibrate in response to the z-axis output signal. The piezo-electric material vibrates for a pre-determined period of time.

Seffernick discloses a z-axis output cursor control device. However, Seffernick does not disclose a control circuit to sense the z-axis output signal and provide a control signal to the piezo-electric material. Saarmaa discloses placing a piece of piezo-electric material in a device. The Saarmaa reference does not show operating the piezo-electric material for a pre-determined period of time in response to a z-axis output signal. Woodard shows a processor 10 that is connected to a switch 40 that is connected to transducer 28. The transducer is turned on in response to an external signal. Woodard does not show controlling the piezo-electric material for a pre-determined period of time in response to a z-axis output signal.

None of the cited references teach, disclose or suggest a piezo-electric material mounted to a semi-rigid substrate. Seffernick does not use a semi-rigid substrate.

The cursor control device of the present invention is advantageous over prior art devices, since it can sense the depression of a pointing stick (z-axis click) and give a feedback to the user by vibrating the cursor control device for a pre-determined period of time such that the user is aware of his or her selection.

There is no basis for making the suggested combination. As the court of Appeals for the Federal Circuit has set forth, even if a prior art reference could be modified to construct an applicant's invention, the modification is not obvious unless there is a suggestion in the prior art. *In re Laskowski*, 10 USPQ2d 1397, 1398 (Fed. Cir. 1989). There is no suggestion to modify Seffernick to include a control circuit that senses a z-axis output signal and provides a control signal to cause the piezo-electric

material to vibrate in response to the z-axis output signal. The piezo-electric material being adapted to vibrate for a pre-determined period of time.

At best, if the combination of Seffernick, Saarmaa and Woodard were made, it would result in a combination that could only be activated by an external signal received through a receiver. The combination would fail to have a control circuit that senses the z-axis output signal and provides a control signal to cause the piezo-electric material to vibrate for a pre-determined period of time.

The final office action indicated that tactile feedback on Z-axis is equivalent to mouse click and that it could not continue indefinite time without citing any specific references.

The burden of establishing a prima facie case of obviousness based upon the prior art can be satisfied only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ 2d 1596, 1598 (Fed. Cir. 1988) (citing *In re Lalu*, 747, F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1984). There is no basis for making the combination of Seffernick, Saarmaa and Woodard.

Issue 2 - Whether claims 3-6 and 9 are patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108) and further in view of Woodard (US 6,259,188)?

Dependent claim 3 recites the semi-rigid material is a thin layer of metal.

Dependent claim 4 recites the semi-rigid material is an alumina material.

Dependent claim 5 recites the semi-rigid material comprises an additional piezo-electric wafer.

Dependent claim 6 recites the semi-rigid material comprises a ceramic material.

Dependent claim 9 recites the piezo-electric material comprises a plurality of layers of piezo-electric material.

None of the cited references teach, disclose or suggest a piezo-electric material mounted to a semi-rigid substrate.

None of the cited references teach, disclose or suggest using a thin layer of metal, alumina, ceramic or multiple layers of piezo-electric material.

Paragraph 52 of Saarmaa states that the actuator can be manufactured in large sheets of multiple units. It is silent in regards to using several layers of piezo-electric material that are mounted to a semi-rigid substrate.

Issue 3 - Whether claims 7 and 8 are patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108), Woodard (US 6,259,188) and Barber (US 5,973,670)?

Dependent claim 7 recites an indicating circuit for providing an indicating signal when the cursor is placed over a predefined position on a display and the control circuit providing the control signal to cause the piezo-electric material to vibrate in response to the indicating signal.

Dependent claim 8 recites an indicating circuit for providing an indicating signal is active when the cursor is placed over an active area on the display.

Claims 7 and 8 depend from claim 1 and 4, respectively and are allowable for

the same reasons recited under issue 1.

Issue 4 - Whether claim 10 is patentable under 35 USC 103 over Barber (US 5,973,670) in view of Seffernick (US 5,966,117), Saarmaa (US Patent Application Publication 2001/0005108) and Woodard (US 6,259,188)?

Independent claim 10 recites a computer input system that has a computer, a cursor control device electrically connected to the computer and software for determining a cursor position based upon user actuation of the cursor control device; the cursor control device having an x-, y-, and z-axis sensor system, a piezo-electric material mounted to a semi-rigid material and mechanically coupled to the cursor control device, an electric circuit for generating a predefined signal and an electrical interconnection between the computer and the piezo-electric material. The piezo-electric material vibrating upon activation by the predefined electrical signal. The software determining a condition requiring tactile feedback and providing the predefined electrical signal to the piezo-electric material in the cursor control device. The software further adapted to cause the piezo-electric material to vibrate for a predetermined period of time.

As advanced in issue number 1, It is respectfully submitted that a factual basis for the rejection of claim 10 has not been supplied and that the rejection relies upon hindsight reconstruction of the invention.

Barber discloses a structure to provide tactile feedback to a cursor control device. The structure of Seffernick discloses a z-axis output cursor control device. Saarmaa discloses placing a piece of piezo-electric material in a device. The Saarmaa

reference does not show a piezo-electric material mounted to a semi-rigid material and mechanically coupled to the cursor control device.

Woodard shows a processor 10 that is connected to a switch 40 that is connected to transducer 28. The transducer is turned on in response to an external signal. Neither Barber nor Woodard show controlling the piezo-electric material for a pre-determined period of time in response to a z-axis output signal.

None of the cited references teach, disclose or suggest a piezo-electric material mounted to a semi-rigid substrate. Barber teaches that a piezo-electric element 52 causes a plunger 48 to reciprocate (column 5, lines 3-5). There is no disclosure in Barber of using a semi-rigid substrate.

As in issue 1, there is no basis for making the suggested combination. There is no suggestion in Barber to add a piezo-electric material and a control circuit and software to allow for vibrations for a pre-determined time.

Issue 5 - Whether claims 11-12, 15 and 16 are patentable under 35 USC 103 over Barber (US 5,973,670) in view of Seffernick (US 5,966,117), Saarmaa (US Patent Application Publication 2001/0005108) and Woodard (US 6,259,188)?

Claims 11-12, 15 and 16 are dependent from independent claim 10, respectively and are considered allowable by virtue of their dependencies. Claims 11-12, 15 and 16 add additional patentable features to the claims. Claim 11 adds the predefined electrical signal being an ac signal. Claim 12 adds the ac signal being at least 20 volts peak to peak with a frequency of at least 300 Hz. Claim 15 adds the cursor control device is a pointing stick and claim 16 adds the cursor control device is a mouse.

Issue 6 - Whether claim 18 is patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108), Woodard (US 6,259,188) and Krukovsky (US 6,323,842)?

Independent claim 18 recites a tactile feedback for a cursor control device that includes a cursor control device to provide a desired cursor movement. A piezo-electric assembly operable as a source of vibrations. A control device for sensing a predefined condition and providing an electrical signal to activate the piezo-electric assembly. The piezo-electric assembly is mechanically coupled to the cursor control device to deliver the vibrations to a user. An input suppression module is coupled to the cursor control device. The input suppression module is adapted to deactivate the cursor control device for a pre-determined period of time in response to detecting the electrical signal generated by the control device.

None of the cited references include an input suppression module.

Krukovsky discloses a mouse with a disabling device. Column 3, lines 62 to column 4, line 2, states that the disabling switch (2) is connected to the X and Y position signals and is operable to turn off the mouse in response the user manually moving switch 2.

In the present invention, the input suppression module automatically detects the electrical signal generated by the control device and disables the cursor control. No manual intervention is required.

Assuming that the combination with Krukovsky could be made, it would require the operator to manually turn off the cursor control device prior to the start of vibrations

from the piezo-electric assembly. Clearly, this is impractical and different than the present invention.

Further, there is no suggestion in Seffernick, Saarmaa or Woodard of using a disabling device.

Since the teachings relied upon are not present in the cited references, the combination fails to disclose the invention of claim 18.

Issue 7 - Whether claim 19 is patentable under 35 USC 103 over Seffernick (US 5,966,117) in view of Saarmaa (US Patent Application Publication 2001/0005108), Woodard (US 6,259,188) and Krukovsky (US 6,323,842)?

Independent claim 19 recites a method for providing a tactile feedback comprising the following steps:

providing a cursor control device;

providing a piezo-electric assembly that vibrates upon electrical activation;

mounting the piezo-electric assembly to the cursor control device to provide a mechanical transfer of vibrations from the piezo-electric assembly to the cursor control device;

sensing a predefined condition for which tactile feedback is desired;

disabling the cursor control device when the predefined condition is sensed;

activating the piezo-electric assembly to provide mechanical vibrations to the cursor control device for a predetermined period of time; and

enabling the cursor control device after the predetermined period of time.

For the same reasons advanced under issue 6, claim 19 is also allowable. Krukovsky fails to disclose a device that senses a predefined condition, disables the cursor control device and then reactivates the cursor control device after a period of time.

Conclusion

For the extensive reasons advanced above, Appellant respectfully contends that each claim is patentable. Accordingly, reversal of all rejections is courteously solicited.

Respectfully submitted,

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Appendix

The claims involved in the appeal follow below:

1. A tactile feedback apparatus for a cursor control device comprising:

a cursor control mechanism;

a piezo-electric material mounted on a semi-rigid substrate;

the substrate coupled to the cursor control mechanism; and

a control circuit electrically interconnected to the piezo-electric material for providing a signal to cause the piezo-electric material to vibrate;

the cursor control mechanism providing a z-axis output signal in response to being actuated by an operator;

the control circuit sensing the z-axis output signal and providing a control signal to cause the piezo-electric material to vibrate in response to the z-axis output signal; and

the piezo-electric material adapted to vibrate for a pre-determined period of time.

3. The tactile feedback apparatus of claim 1 and wherein:

the semi-rigid material is a thin layer of metal.

4. The tactile feedback apparatus of claim 1 and wherein:

the semi-rigid material is an alumina material.

5. The tactile feedback apparatus of claim 1 and wherein:

the semi-rigid material comprises an additional piezo-electric wafer.

6. The tactile feedback apparatus of claim 1 and wherein:

the semi-rigid material comprises a ceramic material.

7. The tactile feedback apparatus of claim 1 and further comprising:

an indicating circuit for providing an indicating signal when the cursor is placed over a predefined position on a display; and

the control circuit providing the control signal to cause the piezo-electric material to vibrate in response to the indicating signal.

8. The tactile feedback apparatus of claim 4 and wherein

the indicating circuit for providing an indicating signal is active when the cursor is placed over an active area on the display.

9. The tactile feedback apparatus of claim 1 and wherein the piezo-electric material comprises a plurality of layers of piezo-electric material.

10. A computer input system comprising:

a computer;

a cursor control device electrically interconnected to the computer;

software for determining a cursor position based upon user actuation of the cursor control device;

the cursor control device further comprising:

an x-, y-, and z-axis sensor system;

a piezo-electric material mounted to a semi-rigid material and mechanically coupled to the cursor control device;

an electric circuit for generating a predefined signal;

an electrical interconnection between the computer and the piezo-electric material, the piezo-electric material being formed to vibrate upon activation by the predefined electrical signal;

the piezo-electric material providing tactile feedback to the user when activated by the predefined electrical signal;

the software determining a condition requiring tactile feedback and providing the predefined electrical signal to the piezo-electric material in the cursor control device; and

the software further adapted to cause the piezo-electric material to vibrate for a predetermined period of time.

11. The computer input system of claim 10 and further comprising:

the predefined electrical signal is an ac signal.

12. The computer input system of claim 11 and wherein

the ac signal is at least 20 volts peak to peak with a frequency of at least 300 Hz.

15. The computer input system of claim 10 and wherein the cursor control device is a pointing stick.

16. The computer input system of claim 10 and wherein the cursor control device is a mouse.

18. A tactile feedback for a cursor control device comprising:

a cursor control device for providing a desired cursor movement;

a piezo-electric assembly operable as a source of vibrations;

a control device for sensing a predefined condition and providing an electrical signal to activate the piezo-electric assembly; and wherein the piezo-electric assembly is mechanically coupled to the cursor control device to deliver the vibrations to a user; and

an input suppression module coupled to the cursor control device, the input suppression module adapted to deactivate the cursor control device for a pre-determined period of time in response to detecting the electrical signal generated by the control device.

19. A method for providing a tactile feedback comprising the following steps:

providing a cursor control device;

providing a piezo-electric assembly that vibrates upon electrical activation;

mounting the piezo-electric assembly to the cursor control device to provide a mechanical transfer of vibrations from the piezo-electric assembly to the cursor control device;

sensing a predefined condition for which tactile feedback is desired;

disabling the cursor control device when the predefined condition is sensed;

activating the piezo-electric assembly to provide mechanical vibrations to the cursor control device for a predetermined period of time; and

enabling the cursor control device after the predetermined period of time.